NASA SCIENCE MISSION DIRECTORATE

Earth-Sun System Applied Sciences Program
Coastal Management Program Element
FY2005-2009 Plan

Version 1.1

March 15, 2005

Expanding and accelerating the realization of economic and societal benefits from Earth-Sun System science, information, and technology

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NASA Science Mission Directorate
Earth-Sun System Division
Applied Sciences Program

Applied Sciences for the Coastal Management Program Element

This document contains the Coastal Management Program Element Plan for FY 2005-2009. This plan derives from direction established in the NASA Strategic Plan, Earth Science Enterprise and Space Science Enterprise Strategies, Earth Science Applications Plan, and OMB/OSTP guidance on research and development. The plan aligns with and serves the commitments established in the NASA Integrated Budget and Performance Document.

The Program Manager and the Applied Sciences Program Leadership have reviewed the plan and agree that the plan appropriately reflects the goals, objectives, and activities for the Program Element to serve the Applied Sciences Program, Earth-Sun System Division, NASA, the Administration, and Society.

(Signature on file)   February 11, 2005
Lawrence Friedl   Date
Program Manager, Coastal Management
Applied Sciences Program
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NASA Earth-Sun System Division: Applied Sciences Program
Coastal Management

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Coastal Management Program Element Plan: FY 2005 - 2009

I. Purpose and Scope

This plan articulates the goals and direction of the Coastal Management Program Element for the period from 2005 to 2009 by detailing the purpose of the program and our strategy to fulfill the Coastal Management mission with the resources available. The plan describes the program's scope, including NASA's role in partnerships, the focus on decision support tools, and the types of science research results we seek to extend. Within the Earth-Sun System Division, this plan functions as a program management tool, describing the program structure, functional mechanisms, performance measures, and general principles that the Coastal Management activity will follow. The plan includes projects in which science research results can be applied to decision making with related socioeconomic benefits.

The Coastal Management Program Element is one of twelve elements in the Applied Sciences National Applications Program. NASA and the National Applications Program collaborate with partner organizations to enable and enhance the application of NASA's Earth-Sun system science results to serve national priority policy and management decision-support tools. The desired outcome is for partner organizations to use project results, such as prototypes and benchmark reports, to enable expanded use of Earth science products and enhance their decision-support capabilities.

The Coastal Management Program Element[1] extends Earth-Sun science research results, products derived from Earth-Sun science information, models, technology, and other capabilities into partners' decision support tools for coastal (including marine and ocean) management issues. The Coastal Management Program supports partners on issues of concern related to coastal zones, nearshore environments, marine and open-ocean activities, wetlands, estuaries, reefs, oceanic islands, and coasts of large inland waters. The program element focuses on decision tools serving the following classes of issues related to coastal, marine, and oceanic regions:
- Environmental resource management;
- Economic management and trade;
- Emergency management and response;
- Mitigation & adaptation of sea level changes; and,
- Public and environmental health.

NASA partners with Federal agencies and regional-national organizations that have coastal management responsibilities and mandates to support coastal resource managers – primary partners are the National Oceanic and Atmospheric Administration (NOAA), US Environmental Protection Agency (EPA), and the Naval Research Laboratory (NRL). The program participates with international organizations on coastal activities, usually through a US partner. Some Coastal Management activities may relate to the Water Management, Ecological Forecasting, Disaster Management, and other program elements. Through its activities, the Coastal Management program provides results for NASA support to Administration, interagency, and international activities, including the White House Committee on Environment and Natural Resources, Climate Change Science Program (CCSP), Climate Change Technology Program (CCTP), Coral Reef Taskforce, and Integrated Global Observing Strategy (IGOS).

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[1] Referred to within interchangeably as the program element, application, and program.

Examples of Earth science missions for the Coastal Management Program include: Terra, Aqua, Aquarius, Jason, TOPEX/Poseidon, Ocean Surface Topography Mission (OSTM), QuikSCAT, SeaWinds, NPP, and NPOESS. Examples of Earth science models include NCOM, POM, SWAN, SHORECIRC, and ADCIRC. The project plans associated with the Coastal Management program element designate specific sensors and models, and they state specific activities with the partners to extend Earth science measurements, environmental data records, and geophysical parameters.

This plan covers objectives, projects, and activities for Fiscal Years 2005-2009. In Fiscal Year 2005 (FY05), the program's priority activities focus on 1) continuing work to extend MODIS chlorophyll and sea surface temperature (SST) products to NOAA's Harmful Algal Bloom (HAB) Bulletin and Mapping System, 2) validating Earth science products (e.g., MODIS SST, QuikSCAT winds) for decision tools for oil spills and/or coral reefs, and 3) evaluating Earth science products for decision support activities related to sea level rise.

In FY06-09, the program's priorities focus on 1) validating an expanded set of products (e.g., chlorophyll advection products) to enable HAB Bulletin to improve performance (accuracy, early detection, tracking, etc.) and geographic coverage; 2) benchmarking Earth science products and expanding the set of products to extend to oil spills and/or coral reefs; 3) extending Earth science products to policy tools and adaptation activities related to climate change coastal issues; and, 4) extending Earth science products from upcoming sensors (e.g., NPP, OSTM, Aquarius) to current and future coastal decision tools.

Scope within NASA and Applied Sciences Program

The Coastal Management Program Element is managed in accordance with, and is guided by, the NASA Strategic Plan and Earth Science Enterprise Strategy. The program element benefits from Earth-Sun system science results and capabilities including Operation System Simulation Experiments (OSSEs), Project Columbia, the Joint Center for Satellite Data Assimilation (JCSDA), the Earth-Sun System Gateway (ESG), and the Transition from Research to Operations (R2O). The program element utilizes initiatives such as the Global Information Grid (GIG) and Federal Enterprise Architecture (FEA) and cooperates with national Earth-Sun laboratories and international programs.

The FY05 President's Budget for the NASA Applied Sciences Program* specifies $54M annually for FY05-FY09 for the National Applications ($24M) and Crosscutting Solutions ($30M) activities. While directly managing a subset of the $24M National Applications budget, the Coastal Management Program Element (and each of the national applications) benefits from the performance results of the $30M budget for Crosscutting Solutions (see Crosscutting Solutions Program Element Plan). The Coastal Management Program Element leverages and extends research results from the approximately $2.1B per year supporting Earth-Sun system science research and development of innovative aerospace science and technology.

Additional information about the NASA Applied Sciences Program can be found at http://science.hq.nasa.gov/earth-sun/applications.

* The National Applications and Crosscutting Solutions components of the Earth Science Applications Theme in the NASA FY05 Integrated Budget & Performance Document

II. Goals and Objectives

The goal of the Coastal Management Program Element is to:

Enable partners' beneficial use of NASA Earth-Sun system science results, observations, models, and technology to enhance decision support capabilities serving their coastal management and policy responsibilities.

Major tenets of the Coastal Management program's goal include:

Develop and nurture partnerships with appropriate coastal organizations

Identify and assess partners' coastal management responsibilities, plans, and decision support tools and evaluate capacity of Earth science results to support the partners

Validate & verify application of Earth science results with partners, including development of products and prototypes to meet partners' requirements

With partners, document value of Earth science results relative to partners' benchmarks and support adoption into operational use

Communicate results & partners' achievements to appropriate coastal communities and stakeholders

In addition, the Coastal Management program promotes NASA and Earth-Sun System goals and science research priorities, such as OSSEs, FEA, and Earth-Sun System Gateway, and the program's objectives and activities support and contribute to NASA's goals (e.g., IWGEO, international commitments).

Objectives

The Coastal Management program serves the NASA Strategic Plan Objectives 1.2 and 3.1, and the NASA Integrated Budget and Performance Document (IBPD) Performance Measure 5ESA8 *(ifmp.nasa.gov/codeb/budget2005/)* or *(www.nasa.gov/about/budget/index.html).*

In specific, the Coastal Program will support the Sea Level Change activities within IWGEO.

Specifically, the Coastal Management program pursues the following short- and near-term objectives:

Short-term Objectives (FY05)

QI-II 2005	Establish joint development plans with partners on validation of Earth science products (e.g., Aqua, SeaWinds, NPP, POM models) for at least one priority coastal issues (e.g. HAB, oil spills, coral reefs) and enhancement of corresponding decision support tools.
	Produce a summary and analysis of strategic plans and goals for Federal agencies and organizations responsible for coastal management. Contribute to IWGEO.
	Complete white paper on at least one additional coastal issue, such as sediment transport or hypoxia, and related decision support tools (see Section IV for issues).
QIII - IV 2005	Complete a report on sea level change – including an analysis of any decision support tools, policy analysis tools, or scenario assessment tools – for potential Earth science product support and IWGEO contribution. (This activity is associated with CCSP Goal 4.)
	Publish at least one article on coastal applications of Earth science products.
5ESA8	Complete at least one verification/validation or prototype of Earth science results (e.g., winds, temperature, chlorophyll from Terra, Aqua, SeaWinds, Jason, etc.) for at least one coastal decision support tools (e.g., HAB Bulletin, GNOME, CREWS/ReefBase), including

REASoN project.

Establish plan and/or agreement with partners, especially NOAA, on validation of Earth science for coastal management. *The plan to identify priorities and approach.*

Establish joint development plans with partners on validation of Earth science products (e.g., Aqua, SeaWinds, NPP, POM models) for at least 2 priority coastal issues (e.g. HAB, oil spills, coral reefs) and enhancement of corresponding decision support tools.

Near-term Objectives (FY06-FY09)

	Evaluate potential of POES, GOES N-P products to serve HAB, CREWS, GNOME, and other tools.
QI-II 2006	Evaluate at least one additional priority coastal topic, such as sediments or wetlands, and its associated decision support tools for potential Earth science product support (see Section IV for issues) – report to identify candidate measurements and models.
QIII-IV 2006	Evaluate potential of NPP products (e.g., OSSE) to serve HAB, CREWS, GNOME, and other tools.
	Complete benchmark reports on performance of Earth science products from at least 2 sensors (e.g., Aqua, SeaWinds, etc.) or models (e.g., POM, ADCIRC) into at least 1 coastal decision support tools (e.g., HAB, CREWS).
2007	Publish at least two articles on coastal applications of Earth science, including at least one in a peer-reviewed journal.
	Complete benchmark reports on performance of Earth science products from at least 3 sensors (e.g., Aqua, SeaWinds, etc.) or models (e.g., POM, ADCIRC) into at least 2 separate coastal decision support tools (e.g., HAB, CREWS).
	Evaluate potential of OSTM (e.g., OSSE) products to serve HAB, CREWS, GNOME, and other tools.
2008	Verify, validate, and complete benchmark report on performance of Earth science products from at least 4 sensors (e.g., Aqua, SeaWinds, Jason, OSTM, etc.) or models into at least 3 separate coastal decision support tools (e.g., HAB, CREWS).
	Evaluate potential of Aquarius (e.g., OSSE) products to serve HAB, CREWS, GNOME, and other tools.
2009	Evaluate application of GPM and HYDROS products to serve HAB, CREWS, GNOME, and other priority coastal decision support tools.
	Publish at least three articles on coastal applications of Earth science, including at least one in a peer-reviewed journal.
	Complete benchmark reports on performance of Earth science products from at least 5 sensors (e.g., Aqua, SeaWinds, etc.) or models (e.g., POM, ADCIRC) into at least 4 separate coastal decision support tools (e.g., HAB, CREWS).

Note: The objectives are cumulative totals for the program rather than specific to an individual year.

III. Program Management and Partners

A. Program Management

Coastal Program Manager: *Lawrence Friedl, NASA-Headquarters*
- Program development, strategy, plans and budgets
- Program representation and advocacy; report results and issues to ESE management & beyond
- Manage program to meet IBPD objectives and serve program assessments (e.g., PART)
- Communication of ESE priorities and directives to Coastal program team and network
- Implementation of interagency agreements and partnerships
- Represent program and ESE through interagency/international committees and working groups
- Monitor Coastal Management program measures and performance evaluation

Coastal Deputy Program Manager: *Callie Hall, NASA-Stennis*
- Leadership on project plans, development, performance, and partnership relationships
- Communication of project measures, performance, status, and issues to Program Manager
- Leadership and communication to Coastal program team and network
- Coordination between NASA Centers on Coastal Management program activities
- Management of grants & cooperative agreements funded through Stennis
- Management of Coastal Management program tasks at Stennis Space Center

B. Coastal Management Network & Partners

The program element maintains a network of organizations and points-of-contact associated with coastal management activities. (Network details maintained in a separate document.)

Applied Sciences & NASA Centers:

Water & Energy Cycle Theme	Jared Entin, NASA HQ
Carbon Cycle and Ecosystems Theme	Diane Wickland, NASA HQ
Climate Variability and Change Theme	Don Anderson, NASA HQ
Ocean Biogeochemistry	Paula Bontempi, NASA HQ
Physical Oceanography	Eric Lindstrom, NASA HQ
Business & Budget	Joan Haas, NASA HQ
Stennis Space Center (SSC)	Callie Hall
Jet Propulsion Laboratory (JPL)	Tony Freeman
Goddard Space Flight Center (GSFC)	Peter Hildebrand / Gene Feldman
GSFC-Wallops Flight Facility (WFF)	John Gerlach
Ames Research Center (ARC)	Liane Guild

Federal Partners

NOAA	Steve Raber (CSC)
	Chris Brown (NESDIS)

- National Ocean Service (NOS)
- National Marine Fisheries Service (NMFS)
- National Environmental Satellite, Data and Information Service (NESDIS)
- NESDIS National Coastal Data & Distribution Center (NCDDC)
- NOS Coastal Services Center (CSC)

US EPA...Greg Serenbetz
   - Office of Water (OW)
   - Office of International Activities (OIA)
   - Office of Environmental Information (OEI)
   - Office of Research and Development (ORD)
   - Gulf of Mexico Program Office (GMPO)

NRL ....Bob Arnone

State Department ....Larry Sperling
   - Blue Water-White Water Initiative

The Coastal Application seeks to build partnerships with the US Army Corps of Engineers (USACE), the US Coast Guard (USCG), and offices within the Interior Department, including Minerals Management Service (MMS), Fish and Wildlife Service (FWS), US Geological Survey (USGS).

International, National & Regional Organizations
   Oceans.US
   IGOS: Integrated Global Observing Strategy (Coastal Theme)
   Coral Reef Taskforce
   Ecology and Oceanography of Harmful Algal Blooms (ECOHAB)
   Ocean Conservancy
   Coastal States Organization
   Coastal America
   Association of American Port Authorities
   Coastal Conservation Association
   Applied Coherent Technologies (ACT) – private company with NASA Cooperative Agreement
   Roffer's Ocean Fishing Forecasting Service Inc – private company with NASA Grant

Distributed Active Archive Centers (DAAC) & Earth Science Modeling Centers:
   Physical Oceanography DAAC (PO DAAC - JPL)
   Global Hydrology Resource Center (GHRC - MSFC)
   GSFC Earth Science DAAC (GES DAAC - GSFC)
   Land Processes DAAC (LP DAAC - USGS)
   Laboratory for Hydrospheric Processes (GSFC)

IV. Decision Support Tools and Coastal Management Issues

Priority Decision Support Tools

Harmful Algal Bloom (HAB) Forecast & HAB Mapping System
   NOAA operates the HAB Forecast system to identify, track, and monitor the status of harmful algal blooms in the northern and eastern Gulf of Mexico, and NOAA operates the HAB Mapping System to give coastal managers and the public access to data and information on HAB conditions. NOAA sends notices via e-mail to coastal resource managers on HAB events. Earth science products, such as chlorophyll and winds, provide insight into location and transport of HABs. The Coastal Management application works with NOAA and NRL on use of MODIS products, QuikSCAT winds, other products, and data fusion techniques to assist the HAB reporting. (*www.csc.noaa.gov/crs/habf/index.html).*

Coral Reef Early Warning System (CREWS) & ReefBase
>NOAA operates CREWS and produces automated electronic mail and Internet-based alerts when conditions are expected to be conducive or predictive of coral bleaching. CREWS uses Earth science data such as wind speed, sea surface temperature, and primary productivity to assess potential bleaching conditions. Similarly, ReefBase provides information and mechanisms to serve international coral reef policy and management activities.
>CREWS: (*www.coral.noaa.gov/crews/index.shtml*)   ReefBase: (*www.reefbase.org*)

General NOAA Oil Modeling Environment (GNOME)
>NOAA developed GNOME to predict how wind, current, river flow, and tidal processes spread oil spills and predict oil changes over time based on weathering. GNOME serves as a training tool as well as a diagnostic tool for full tactical support for actual spill response. Earth science products, such as wind speeds and temperatures, provide insights into location, spread and transport of spills (*response.restoration.noaa.gov/software/gnome/gnome.html*).

Potential Coastal Management Issues: FY05-09

On an on-going basis, the program consults with partners to identify important issues facing the coastal community, examines associated decision support tools, and determines priorities within the Coastal Management program portfolio. Topics include:

Sediment transport	Marine shipping and port management
Wetlands & estuary management	Sea-level change & Coastal inundation
Hypoxia and eutrophication	Stormwater Runoff

Fishery management (including marine fisheries, aquaculture, high-seas drift nets, etc.)

Cross-Application Activities

The Coastal Management team coordinates and evaluates activities jointly with other National Applications on related topics and decision support tools. Related topics include:

Connections with Ecological Forecasting: Coral Reefs & Marine Fisheries
For coral reefs, see CREWS/ReefBase description in Section IV.
Marine fisheries represent a major natural resource and economic market. The Coastal Management team works with the Ecological Forecasting application to extend Earth science observations and model outputs to support marine fishery management practices.

Connection with Water Management: Stormwater Runoff
Several federal and state organizations have identified this issue as a significant problem facing state and local governments across the country, especially in coastal regions. The Coastal Management team works with the Water Management program element to examine this issue, identify decision support tools, and determine a coordinated approach.

V. Application Activities

A. Projects

The Coastal Management program element authorizes directed projects to support the program's goal and objectives. The respective Project Managers are responsible for developing project plans and managing the activities. Project plans specify Earth science observations, models, and other outputs to the decision support tools as well as the activities to produce the appropriate deliverables. Projects will likely use observations from sensors on: Terra, Aqua, QuikSCAT, Aquarius, NPP, TOPEX-Poseidon, Jason, and OSTM.

Project: Harmful Algal Blooms					
The purpose is to validate and benchmark the performance of Earth science products, especially satellite products and coastal-ocean models, for beneficial & routine use in NOAA HAB decision support tools. This project works in coordination with the REASoN-funded project. Priority DSS: HAB Bulletin, HAB Mapping System. Budget reflects funds to support NASA's activities in cooperative agreement with NRL, ACT, NOAA. FY05: MODIS Chlorophyll & SST products to NOAA HAB				*Budget ($K)* *Procurement*	
FY06-08: Transition techniques to NOAA for operational support; expand to other Coastal application topics and product lines (hypoxia, sediment transport)				FY05	50
Project Manager	*Centers*	*Timeframe*	*Partners*	FY06	75
Callie Hall-SSC	SSC, GSFC	FY04-FY07	NOAA, NRL, EPA	FY07	75
				FY08	--
				FY09	--
Earth Science Products	Terra-MODIS, Aqua-MODIS, QuikSCAT, Jason, NCOM, ADCIRC, SWAN, SHORECIRC			*Other Apps.*	
Deliverables	Cooperative agreement, contact network, joint development plan, prototype product(s), benchmark report(s), results conference(s)			N / A	

Project: Coral Reefs and/or Oil Spills					
The purpose of this project is to establish relationships and to evaluate, validate and benchmark Earth science products, especially satellite products and coastal-ocean models, for beneficial, routine use in A),CREWS, coral reef management activities, and appropriate international activities; B) GNOME and oil spill monitoring, training, and response activities; or C) both. Priority DSS: CREWS/ReefBase, GNOME FY05: Joint development plan; verification/validation.				*Budget ($K)* *FY05: 220K carry-over*	
FY06-08: Benchmark reports.				FY05	140
Project Managers	*Centers*	*Timeframe*	*Partners*	FY06	140
Callie Hall-SSC	SSC, GSFC, ARC	FY04-FY07	NOAA, NRL, EPA	FY07	140
				FY08	--
				FY09	--
Earth Science Products	Terra – MODIS, Aqua – MODIS, QuikSCAT, SeaWiFS, AVHRR			*Other Apps.*	
Deliverables	Project plan, contact network, prototype product(s), benchmark report(s), results conference(s)			Ecological Forecasting	
Note: Some activities managed through Crosscutting Solutions.					

B. Solicitations

The Coastal Management program selects project through competitive solicitations to serve the program's goal and objectives. For proposals selected through solicitations funded by the Earth Science Applications Program, the Coastal Management program may provide supplemental funding. In addition, the Coastal program may provide funds to projects identified through other ESE solicitations if the projects have specific ties to the program's objectives. The Coastal team facilitates appropriate partnerships between selected investigators and the Coastal application's partners.

REASoN: Coastal Decision Support					
The purpose of this activity is to develop algorithms, utilize data-fusion techniques, produce routine products, and enable use of coastal-ocean model products to support the coastal resource management community. The team focuses initially on HABs and will address additional issues, such as oil spills and coral reefs, as the project develops.				*Budget ($K) (Funding from REASoN)* *$350 in FY03*	
				FY05	500
Studies Manager	*Prin. Investigator*	*Timeframe*	*Partners*	FY06	370
Callie Hall - SSC	Erik Malaret – ACT Bob Arnone - NRL	FY03-FY08	NOAA	FY07	200
				FY08	100
				FY09	--
Earth Science Products	Terra – MODIS, Aqua – MODIS, others, Coastal-Ocean models			*Other Apps.*	
Deliverables	Project plan, semi-annual reports, benchmark reports, results conferences			N / A	
Supplement to REASoN: Coastal Decision Support					
Note: Coastal program plans to provide funds to supplement REASoN funding and maintain activities at $800K over the course of the project. Continued funding is based on good project evaluations and favorable results.				FY05	300
				FY06	430
				FY07	600
				FY08	700
				FY09	--

ORHAB: Supplemental to ECOHAB					
The purpose of this activity is to examine the ability of satellite-based measurements to observe physical oceanographic features that may contribute to the development, identification, and tracking of Harmful Algal Blooms in the Pacific Northwest. The Olympic Region Harmful Algal Blooms (ORHAB) partnership aims to mitigate HAB effects by providing improved tools for protecting public health, building consumer confidence in fishery products, and enhancing revenues for coastal communities. This activity is a cost-share between Research & Applied Sciences (combined $120K per year for 3 years). FY04 funding not needed. Financial support past FY04 depends on interim report(s).				*Budget ($K)* *Note* *$30K in FY03* *$0 in FY04*	
				FY05	30
Studies Manager	*Prin. Investigator*	*Timeframe*	*Partners*	FY06	30
Eric Lindstrom – HQ	Kate Edwards – Univ. of Washington	FY04-FY06	NOAA, EPA, Wash. State	FY06	--
				FY07	--
				FY08	--
Earth Science Products	QuikSCAT, AMSR, MODIS, AVHRR, Topex/Poseidon, SeaWiFS, QUODDY, POM, ELCIRC			*Other Apps.*	
Deliverables	Project plan, semi-annual reports, results conference			N / A	

C. Congressionally Directed Activities

The Coastal Management Program Element manages congressionally directed activities and NASA Challenge Grants associated with the application. The Coastal Management team interacts with the recipients to align their activities with the goals and objectives of the Applied Sciences Program and the Coastal Management Program Element.

Center for Land Use and Education Research (CLEAR), University of Connecticut
This Center expects to do a coastal management-related project in FY05 in collaboration with the NASA DEVELOP program, part of the Crosscutting Solutions Program Element.

D. Program Management

The Coastal application authorizes program management activities that contribute to the overall success of the application through studies, working group participation, program reviews, and similar enabling endeavors.

Program Management: DSTs, Partner Plans, Working Groups, Committees					
• Develop joint development plans, white papers, journal articles, and evaluation reports • Examine strategies, goals, and plans of coastal management organizations • Support interagency, national, regional, and international working groups (e.g., CCSP, Oceans.US, IGOS-Coastal)				*Budget ($K)*	
				FY05	30
Managers	*Centers*	*Timeframe*	*Partners*	FY06	50
				FY07	50
Callie Hall – SSC L. Friedl – HQ	SSC, GSFC, ARC, MSFC, JPL	Annual	NOAA, EPA, USCG, USACE	FY08	50
				FY09	50
Earth Science Products	Reports specify observations and models based on decision support tools and partners' plans			*Other Apps.*	
Deliverables	FY05: Joint development plans for at least 2 coastal issues; summary of strategic plans; white paper on coastal topic; journal article; sea level change evaluation report FY06+: Evaluation report; journal articles; report on POES, GOES, NPP potential; reports on future satellite potential			N / A	
Note: Some activities through Crosscutting Solutions.					

The Coastal Management Program participates and contributes to CCSP Goal 4 "Understand the sensitivity and adaptability of different natural and managed ecosystems and human systems to climate and related global changes." Within Goal 4, the Coastal Management Program addresses one of the seven topics for priority CCSP synthesis products: "Coastal elevation and sensitivity to sea-level rise."

E. Additional Activities & Linkages

NASA Earth Science Research and Education Activities
The Coastal Management Program Element draws on activities supported by the NASA Earth Science Research community and Earth Science Education programs that may have potential or specific applications to the program element's goal and objectives. The Coastal Management program monitors the activities for potential support (See Appendix D).

Crosscutting Solutions
The NASA Coastal Management Program leverages, utilizes, and contributes to priority activities within the Applies Sciences Program, such as the following: Geoscience Standards and Interoperability, Human Capital Development, Integrated Benchmark Systems, and Solutions Networks. Examples of leveraged activities are:
- *Earth-Sun System Gateway*—a "portal of portals" providing an access point through an Internet interface to all web-enabled NASA research results
- *Rapid Prototyping Center*—a proposed center at Stennis to support NASA and partners in testing and verification of Earth science results in decision support tools
- *Transition from Research to Operations Network (R2O)*—a network that focuses on systematically transitioning the results of research to operational uses.
- *DEVELOP*—a student-based program for rapidly prototyping solutions for state and local applications and helping students develop capabilities related to applied Earth-Sun science.

NASA and Science Mission Directorate Priorities
The Coastal Management Program leverages, utilizes, and contributes to priority activities of NASA and the Federal government, including:
- *Federal Enterprise Architecture (FEA)* is a business and performance-based framework to support cross-agency collaboration, transformation, and government-wide improvement.
- *The Global Information Grid (GIG)* is the first stage of a U.S. military global, high-bandwidth, Internet protocol-based communications network (a.k.a., 'internet in space').
- *The Joint Center for Satellite Data Assimilation (JCSDA)* is a multi-agency collaboration to accelerate and improve the quantitative use of research and operational satellite data in weather and climate prediction models. NOAA (NESDIS, NWS, OAR), NASA, Navy, Air Force, and NSF (through UCAR) collaborate in JCSDA.
- *Metis* is a visual modeling software tool for planning, developing, and analyzing agencies' enterprise architectures. The Applied Sciences Program is using Metis to identify possible linkages between observations, models, and decision support tools to support the IWGEO and NASA/NOAA R2O activities.
- *Observing System Simulation Experiments (OSSEs)* use simulated observations to assess the impacts of future satellite instruments on weather and climate prediction, and OSSEs provide opportunities to test new designs and methodologies for data-gathering and assimilation.
- *Project Columbia* is a NASA-wide project to develop a new, fast supercomputer (using an integrated cluster of interconnected processor systems) to support the Agency's

mission and science goals, including enhanced predictions of weather, climate, and natural hazards.

VI. Budget: FY05-09

The following table lists the Coastal Management Program budget (procurement) for FY2005:

Coastal Management

Project	FY05 Procurement Allocation ($K)
HAB Bulletin	$50
Coral Reefs (CREWS) and/or Oil Spills (GNOME)	$140
Supplement to REASoN HAB project	$300
ECOHAB - Pacific Northwest	$30
Working Groups & Reports	$30
Total	**$550**

Appendix C lists program-wide budget allocations for FY2005-09.

VII. Schedule and Milestones

	Activity	Start	FY05			FY06			FY07			FY08			FY09			Comments
	Coastal Management Application -- FY05-09 Schedule																	
HAB	HAB V&V, Benchmark Rpt.	FY05		■	■													
	NCOM in HAB DST	FY04			■	■	■											Product Prototypes
	Transition to NOAA	FY05				■	■	■										
	Future products	FY06					■	■	■	■	■							
CREWS, GNOME	Evaluation Rpt.	FY04	>															Completed FY05-Q1
	Development Plan	FY05		■	■													
	V&V	FY05		■	■	■												
	Benchmark Rpt.	FY06				■	■	■										
Reports	Strat. Plan Analysis	FY05	■															
	Sea Level Change	FY05		■	■	■												
	Identification/ Evaluation Priority Issues For Future Solicitations	FY05		■	■				■	■	■				■	■	■	Sediment, Wetlands, Hypoxia
	Solicitations – V&V, Benchmark Priority Coastal Issues	FY05		■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Conferences	Coastal GeoTools			■			■			■								
	ASLO/TOS/AGU						■							■				
	Coastal Zone					■			■			■						
	Int.Conf. Remote Sensing			■						■								
CCRI	CCRI Coastal			■	■	■	■	■	■	■	■							
Coastal-related Missions	TOPEX/Poseidon	1992	>															
	TRMM	1997	>															EOL: TBD, 2004
	QuikSCAT/SeaWinds	1999	>															
	Terra	1999	>															
	Jason-1	2001	>															
	Aqua	2002	>	■	■	■	■	■	■	■	■							
	GOES N-P	2004	>	■	■	■	■	■	■	■	■	■	■	■	■	■	■	Evaluate potential for coastal DST
	POES	2005		■	■	■	■	■	■	■	■	■	■	■	■	■	■	Evaluate potential for coastal DST
	NPP	2005							■	■	■	■	■	■	■	■	■	Evaluate potential for coastal DST
	OSTM	2008											■	■	■	■	■	Evaluate potential for coastal DST
	Aquarius	2008												■	■	■	■	Evaluate potential for coastal DST

VIII. Program Management and Performance Measures

The Coastal Management team uses performance measures to track progress, identify issues, evaluate projects, make adjustments, and establish results of the program element. The program's goal and objectives (Section II) state what the program intends to achieve. These measures help the team monitor progress within and across specific activities to ensure the program meets its goal and objectives.[2] The management team analyzes these measures retrospectively in order to made adjustments proscriptively to the program approach and objectives.

The measures are in two categories (tables below). Program Management measures are internally focused to assess the activities within the program. Performance measures are externally focused to assess if the program activities are serving their intended purpose.   In general, the Coastal program uses these measures to evaluate the performance of activities conducted and sponsored by the program, especially the projects. In addition, the Earth Science Applications Program uses this information in preparing IBPD directions and PART responses.

Program Management Measures (Internally-focused):

Inputs	Potential issues and DSTs identified for Coastal Management – *number, type, range* Eligible partners to collaborate with – *number, type, range* Potential results/products identified to serve Coastal Management – *number, type, range*
Outputs	Assessments or evaluations of DSTs – *number, range* Assessments of Earth science results/products to serve DSTs – *number, range* Agreements with partners – *presence* Reports (evaluation, validation, benchmark) – *number, type*
Quality & Efficiency	Earth science results/products – *number used per DST, ratio of utilized to potential* Agreements – *ratio of agreements to committed partners* Reports – *partner satisfaction, timeliness, time to develop* Reports – *ratio of validations to potential products, ratio of benchmarks to validations*

Performance & Results Measures (Externally-focused):

Outcomes	Earth science products adopted in DSTs – *number, type, range; use in DST over time* Earth science products in use – *ratio of products used by partners to reports produced* Partner & DST performance – *change in partner DST performance, number & type of public recognition of use & value of Earth science data in DST*
Impacts	Partner value – *change in partner metrics (improvements in value of partner decisions)*

In addition to the stated measures, the Coastal Management program periodically requests an assessment of its plans, goals, priorities, and activities through external review. The Coastal Management team uses these measures along with comparisons to programmatic benchmarks to support assessments of the Earth

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[2] These measures are like gauges in an automobile - they serve as indicators to help the management team track conditions and identify issues in order to keep the program aligned with the plan and meet its objectives.
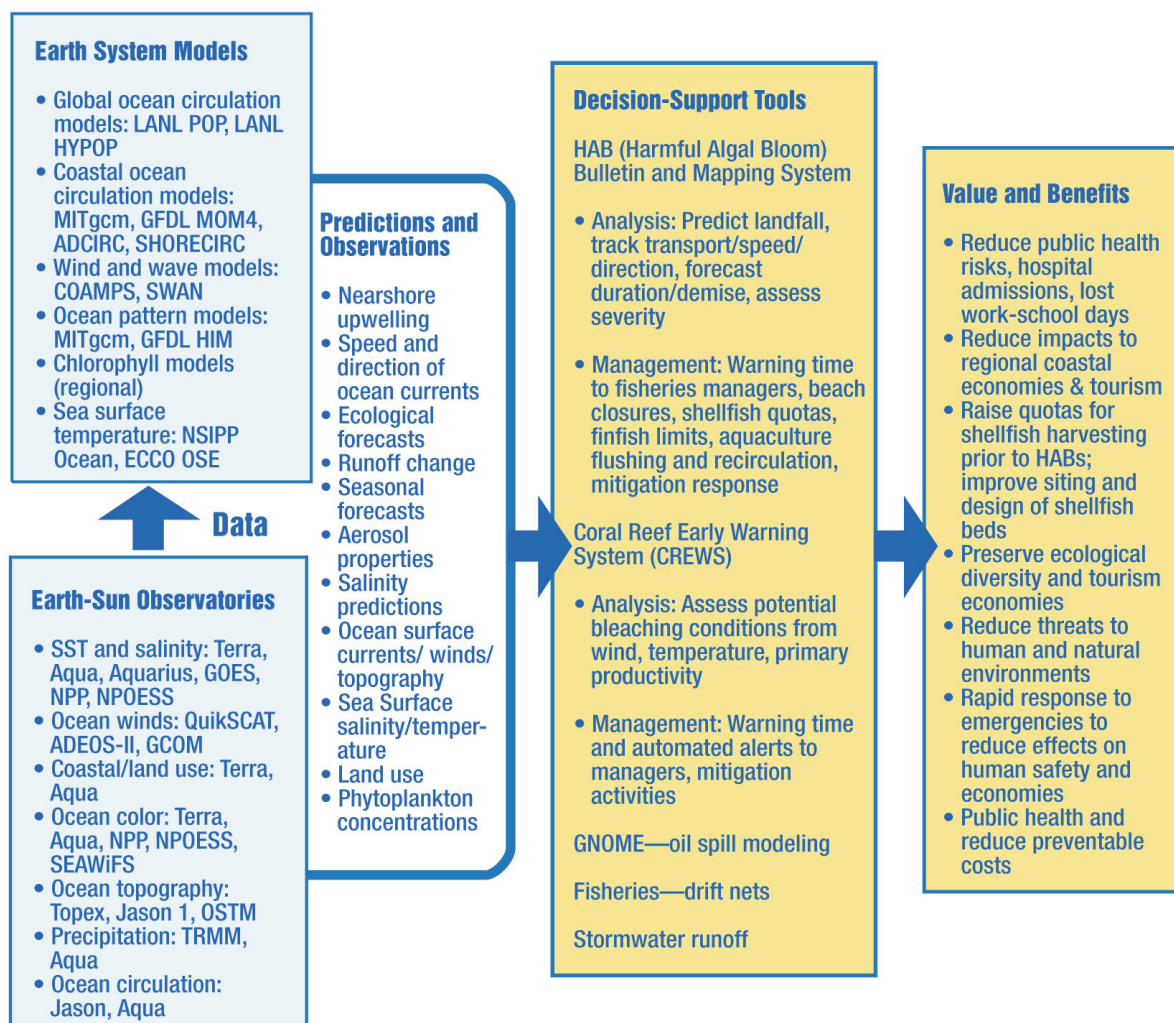
Science Applications Program (e.g. internal NASA reviews and OMB PART). In specific, Coastal Management uses comparisons to similar activities in the following programs (i.e., program benchmarks) to evaluate its progress and achievements:

- Environmental and Societal Impacts Group at NCAR
- NCAR Research to Applications Group
- Global Monitoring for Environment and Security (GMES) in Europe

X. Appendices

## A. Integrated System Solutions Diagram

Figure 1 illustrates a candidate configuration the extension of Earth science measurements, model products, and data fusion techniques to support Coastal Management partners, their decision support tools, and benefits of Earth science to society. Results from Earth-Sun system science are typically observations, data sets, climate data records, algorithms, and models utilizing the observations. For Coastal Management, observations include measures of sea surface temperature, sea surface height, wind speed and direction, ocean color, salinity, and coastal land-cover/use. Models use these and other measurements to generate predictions of coastal and ocean conditions, such as upwelling, primary productivity, and currents. The Coastal Management program works with partners on methods for their decision support tools – HAB Bulletin, CREWS/ReefBase, GNOME, others – to ingest Earth science observations and predictions and, in turn, improve the capabilities of their tools to support their decision processes.

Earth System Models

- Global ocean circulation models: LANL POP, LANL HYPOP
- Coastal ocean circulation models: MITgcm, GFDL MOM4, ADCIRC, SHORECIRC
- Wind and wave models: COAMPS, SWAN
- Ocean pattern models: MITgcm, GFDL HIM
- Chlorophyll models (regional)
- Sea surface temperature: NSIPP Ocean, ECCO OSE

Data

Earth-Sun Observatories

- SST and salinity: Terra, Aqua, Aquarius, GOES, NPP, NPOESS
- Ocean winds: QuikSCAT, ADEOS-II, GCOM
- Coastal/land use: Terra, Aqua
- Ocean color: Terra, Aqua, NPP, NPOESS, SEAWiFS
- Ocean topography: Topex, Jason 1, OSTM
- Precipitation: TRMM, Aqua
- Ocean circulation: Jason, Aqua

Predictions and Observations

- Nearshore upwelling
- Speed and direction of ocean currents
- Ecological forecasts
- Runoff change
- Seasonal forecasts
- Aerosol properties
- Salinity predictions
- Ocean surface currents/ winds/ topography
- Sea Surface salinity/temperature
- Land use
- Phytoplankton concentrations

Decision-Support Tools

HAB (Harmful Algal Bloom) Bulletin and Mapping System

- Analysis: Predict landfall, track transport/speed/ direction, forecast duration/demise, assess severity
- Management: Warning time to fisheries managers, beach closures, shellfish quotas, finfish limits, aquaculture flushing and recirculation, mitigation response

Coral Reef Early Warning System (CREWS)

- Analysis: Assess potential bleaching conditions from wind, temperature, primary productivity
- Management: Warning time and automated alerts to managers, mitigation activities

GNOME—oil spill modeling

Fisheries—drift nets

Stormwater runoff

Value and Benefits

- Reduce public health risks, hospital admissions, lost work-school days
- Reduce impacts to regional coastal economies & tourism
- Raise quotas for shellfish harvesting prior to HABs; improve siting and design of shellfish beds
- Preserve ecological diversity and tourism economies
- Reduce threats to human and natural environments
- Rapid response to emergencies to reduce effects on human safety and economies
- Public health and reduce preventable costs

B. Roadmap

The figure illustrates the evolving, progressive nature of links between the increasing capabilities of NASA-supported research, measurement systems, and technology and their extension to partners' management and policy responsibilities. The yellow bars on the left state the expected research and developments from Earth-Sun system science and technology; the blue bars to the right reflect the contributions of the research in terms of improved management capabilities. Each level shows a steady improvement in the measurements and research along with enhanced management capabilities and public value.[3]

This Coastal application roadmap builds on the roadmaps of the six ESE Science Focus Areas, particularly the Water & Energy Cycle Theme, Carbon Cycle and Ecosystems Theme, and the Climate Variability and Change Theme.

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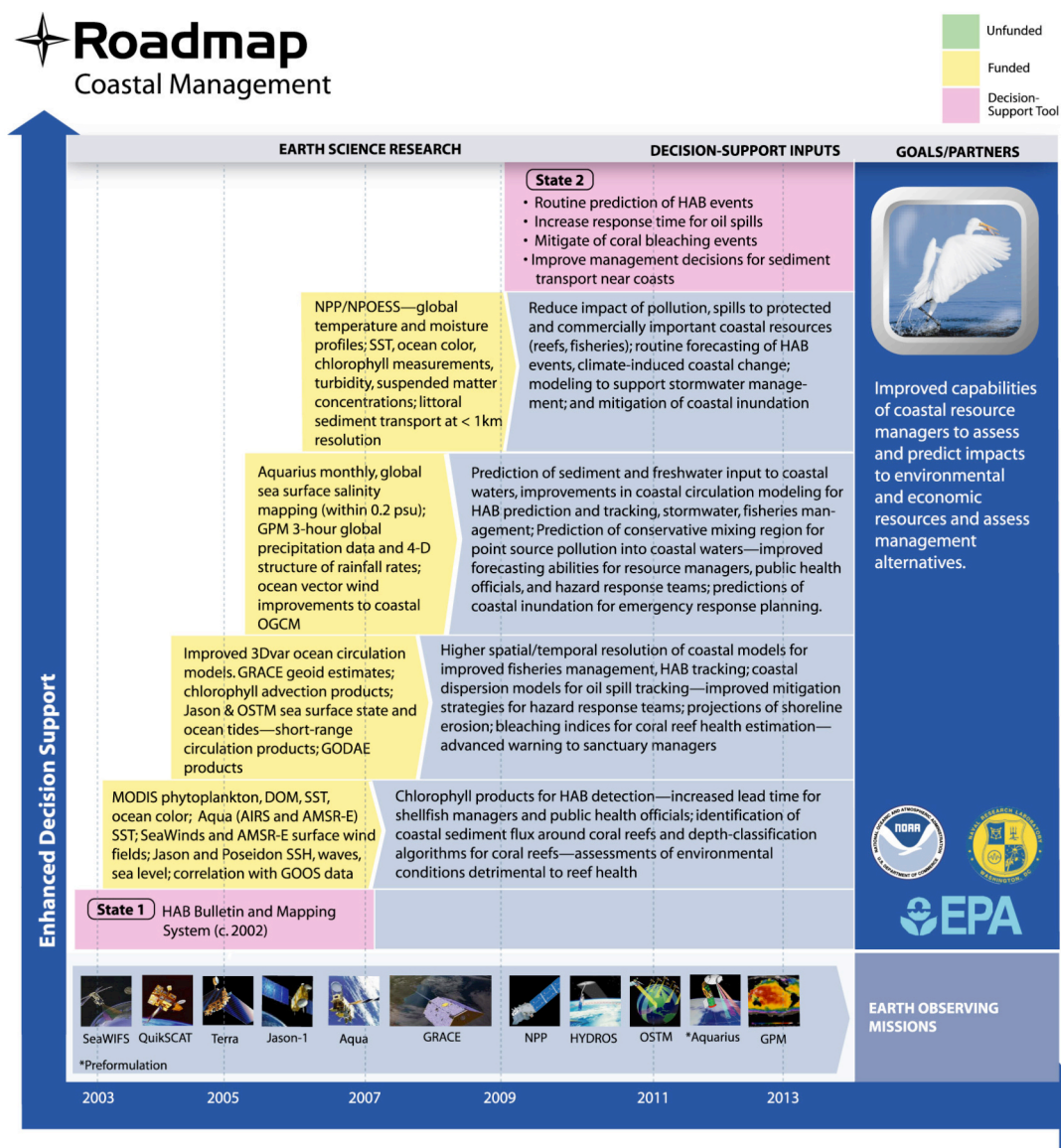
[3] Note: The transition points from yellow bars to blue bars do not necessarily match the time references at the bottom of the chart due to formatting constraints.

C. Applied Sciences Program Budget FY2005

The overall program budget allocations are given below to provide the context in which this National Application is conducted. The allocations are based on Agency and program priorities and are subject to change according to the availability of funds and programmatic strategies. All values are in $ thousands.

*Note: Allocations include full utilization of the Applied Sciences FY04 carryover of approximately $2.7 million.

Table 1: Applied Sciences Procurement Allocation – FY05

Program Element	FY05 Procurement Allocation
National Applications	
Agricultural Efficiency	$ 467
Air Quality Management	$ 995
Aviation	$ 750
Carbon Management	$ 653
Coastal Management	$ 550
Disaster Management	$ 545
SENH	$ 1,429
Ecological Forecasting	$ 610
Energy Management	$ 775
Homeland Security	$ 205
Invasive Species	$ 205
Public Health	$ 725
Water Management	$ 870
Program Director Discretionary Fund	$ 588
Center Director Discretionary Fund Tax	$ 2,485
National Applications Total	$ 11,852
Crosscutting Solutions	
Integrated Benchmarked Systems	$ 3,529
Solutions Networks	$ 1,200
Competitive Solicitations	$ 7,600
Human Capital Development	$ 700
Geoscience Standards & Interoperability	$ 2,000
Crosscutting Solutions Total	$ 15,029
Applied Sciences Program Procurement Total	***$ 26,881***

Table 2: Applied Sciences Program NASA Institutional Allocations – FY05

NASA Center	FY05 Institutional Cost / National Applications	FY05 Institutional Cost / Crosscutting Solutions	Institutional Total
HQ	$3,773	$7,351	$11,124
ARC	$1,108		$1,108
GSFC	$1,009	$1,094	$2,103
JPL			
LaRC	$1,517	$444	$1,961
MSFC	$1,251	$183	$1,434
SSC	$3,194	$8,689	$11,883
Total	*$11,852*	*$17,761*	*$29,613*

D. Related NASA and Partner Solicitations and Grants

Appendix C lists NASA Earth-Sun system science research projects, Earth science fellowships, GLOBE activities, and Earth science New Investigators related to Coastal Management activities.

Research Projects

Interdisciplinary NRA: Coastal–related research projects

Institution	PI	Title/Subject	Timeframe
U. South Florida	Serge Andrefouet	Environmental Assessments of Coral Reef Ecosystems	2004–2006
U. South Carolina	Anthony Boccanfuso	Climate Change and Intertidal Biogeography	2004–2006
Roffer Ocean Fishing Svc.	Mitch Roffer	Study of Ocean Environmental Parameters to Forecast the Effects of Climate Variability on Pelagic Fish Resources	2004–2006
Ocean Imaging	L. Deysher	Monitoring of Global Change in Temperate Reef Communities Using Satellite Remote Sensing Technologies	2004–2006

REASoN: Coastal–related research projects

Institution	PI	Title/Subject	Timeframe
GSFC	Gregg	Development and Maintenance of An Ocean Color Time Series	2003–2006
GSFC	Atlas	A Cross–Calibrated, Multi–Platform Ocean Surface Wind Velocity Product for Meteorological and Oceanographic Applications	2003–2006
JPL	Zlotnicki	Grace Products for Hydrology and Oceanography	2003–2006
URI	Cornillion	A Thematic Data Portal to Satellite–Derived Ocean Surface Properties	2003–2006

NPOESS Preparatory Project: Coastal–related research projects

Institution	PI	Title/Subject	Timeframe
GSFC	McClain	End–to–End Assessment of NPP/VIIRS Ocean Color Data	2004–2006
U.Miami	Minnett	Climate Data Records of Sea Surface Temperature from VIIRS	2004–2006
Stevens	Stamnes	Evaluation of NPOESS Retrieval Algorithms: Atmospheric Correction, Ocean Color Products, and Snow / ICE Products	2004–2006
UMBC	Wang	Assessment and Evaluation of the Atmospheric Correction Algorithm for the NPP VIIRS Ocean Color EDRs	2004–2006

EOS Continuation: Aqua–Terra–ACRIM Solicitation – Coastal–related research projects

Institution	PI	Title/Subject	Timeframe
UMd–CP	Ballabrera–Poy	Physical Controls of the Optical Properties of Upper Ocean Water, and Its Application to Climate Modeling	2004–2006
Moss Landing	Breaker	Response of the Upper Ocean to Varying Meteorological Conditions Using Ocean Models and Satellite Imagery	2004–2006
UNH	Campbell	SeaWiFS–Analog Chlorophyll Algorithm: Insuring Continuity of the Climate Data Record for Chlorophyll	2004–2006
U. South Florida	Carder	Quantifying HAB Concentrations and Chlorophyll A in Coastal Waters	2004–2006
Old Dominion	Cota	Multi–Sensor Coastal Ocean and Atmosphere Time–Series	2004–2006
URI	Dierssen	Benthic Ecology from Space: Algorithms for Remote Sensing of Seagrass Primary Production from the MODIS Ocean Color Sensor	2004–2006
U. Miami	Evans	Improved MODIS Ocean Color and Sea Surface Temperature Calibration to Enable Science, Climate Studies, and Algorithm Development	2004–2006
UCSD	Gille	Dynamics of Sea Surface Temperature Variability in the Southern Ocean	2004–2006
GSFC	Gregg	Development of an Ocean Biogeochemical EOS Assimilation Model (OBEAM)	2004–2006
GSFC	Hooker	Refinement and Maintenance of EOS Ocean Color Algorithms	2004–2006
Columbia	Kaplan	Small–Scale Variability in Sea Surface Temperatures and Climate Analyses Error	2004–2006
UCSB	Maritorena	Chlorophyll A Algorithms for MODIS	2004–2006
Columbia	Marra	Primary Productivity from Ocean Color Based on Photosynthetic Quantum Efficiency and Phytoplankton Absorption	2004–2006
GSFC	McClain	MODIS Ocean Color Calibration and Validation Support	2004–2006
U. Miami	Minnett	Sea–Surface Temperature from MODIS	2004–2006
San Diego	Mueller	HPLC Phytoplankton Pigments Measurements	2004–2006
U. South Florida	Muller–Karger	EAGLE–EYE: Ecological Assessment of Generalized Littoral Environments	2004–2006
UCSB	Nelson	Ocean Optical Properties, MODIS Ocean Products, and Atmospheric Dust: The Bermuda Bio–Optics Project	2004–2006
Arizona State	Neuer	Analysis of Nutrient Budgets and Carbon Export in the Eastern and Western Subtropical North Atlantic Ocean	2004–2006
MSFC	Robertson	Fresh Water Fluxes and Boundary Layer Thermodynamics Over the Global Oceans from Aqua and Other EOS Satellite Measurements	2004–2006
UCSB	Siegel	MODIS Ocean Color Imagery to a Case II Ocean: Case Study of Plumes and Blooms in the Santa Barbara Channel	2004–2006
Stevens	Stamnes	Simultaneous Retrieval of Aerosol Optical Properties and Marine Constituents in Coastal Waters	2004–2006

Institution	PI	Title/Subject	Timeframe
NOAA	Stumpf	Variability of Chlorophyll and Light Availability in Estuarine and Coastal Case 2 Waters	2004–2006
UMBC	Wang	MODIS Atmospheric Correction Algorithm for the Ocean Color Products	2004–2006
Remote Sensing Systems	Wentz	Refinement and Validation of the AMSR–E Ocean Algorithm	2004–2006

Carbon Cycle Science – Coastal–related research projects

Institution	PI	Title/Subject	Timeframe
Plymouth Marine Laboratory, Plymouth, UK	Aiken, Jim	Observation of Air-Sea Interactions & Fluxes of Carbon	2004 award (05-08)
NASA Goddard Space Flight Center	Behrenfeld, Michael	Ocean Productivity from Satellite-Derived Phytoplankton Physiology and Carbon Biomass (NASA)	2004 award (05-08)
Woods Hole Oceanographic Institution	Doney, Scott	Hindcasting Seasonal to Interannual Variability in Air-sea CO_2 Flux for the North American Carbon Project (NASA)	2004 award (05-08)
Oregon State University	Hales, Burke	Development of Algorithms for Prediction of Coastal CO_2 Air-Sea Fluxes Using Remote Sensing	2004 award (05-08)
University of Southern Mississippi	Lohrenz, Steven	Satellite Assessments of Regional pCO_2 Distributions and Air-Sea Fluxes of Carbon Dioxide in a River-Dominated Margin (NASA)	2004 award (05-08)
Bigelow Laboratory for Ocean Science	Matrai, Patricia	Organic Matter Metabolism in a Coastal Ocean Ecosystem (NASA)	2004 award (05-08)
Woods Hole Oceanographic Institution	McGillicuddy, Dennis	A Regional Eddy-Resolving Carbon Cycle Model Surrounding the Bermuda Atlantic Time-Series Study (BATS) Site: Analysis of Remotely Sensed and In Situ Observations (NASA)	2004 award (05-08)
University of New Hampshire	Ollinger, Scott	Scaling and Evaluation of Ecosystem Carbon Uptake Through Integration of Multi-Scale Remote Sensing with AmeriFLUX and NACP Field Observations for the Studies of Earth, Oceans and Space (NASA)	2004 award (05-08)
Lamont Doherty Earth Observatory	Subramaniam, Ajit	Mapping Dissolved Organic Carbon in Eastern U.S. Coastal Waters Using Ocean Color Satellite Data (NASA)	2004 award (05-08)

Fellowships

Funded under Earth Science Education – Fellowship Program

Institution	PI	Title/Subject	Award Years
University of California Santa Barbara	Anderson, Clarissa	2004 award (05-07) A Model for Remotely Detecting the Dynamics and Toxicity of Pseudo-nitzschia Blooms in the Santa Barbara Channel	2004 award (05-07)
Woods Hole Oceanographic Institution	Fewings, Melanie	Physical Processes in Continental Shelf Ecosystems: The Influence of Density Stratification on Phytoplankton Dynamics	2004 award (05-07)

University of Washington	Juranek, Lauren	Improving Satellite-Based Primary Productivity Estimates Using a New In Situ Oxygen Isotope Technique	2004 award (05-07)
Stanford University	Pabi, Sudeshna	Determine Taxon Specific POC Using Remote Sensing	2004 award (05-07)
University of California Davis	Steissberg, Todd	Using Remote Sensing to Quantify Particulate and Solute Fluxes in Aquatic Systems	2004 award (05-07)
Texas A&M University	Wen, Caihong	A Study of Atmospheric Response to Tropical Atlantic Mesoscale SST Variability and the Associated Air-Sea Feedbacks Using Satellite Observations and Numerical Models	2004 award (05-07)
University of South Florida	Conmy, Robyn	Seasonal Distribution and Cycling of CDOM on River-Dominated Shelves: Implications for Remote Sensing Imaging and Source Differentiation.	2003 award (04-06)
University of Maryland Center for Environmental Sciences	Miller, William	Influence of Synoptic-Scale Climate Variability on Phytoplankton Biomass and Primary Productivity in Chesapeake Bay	2003 award (04-06)
University of Florida	Van Holt, Tracy	Twenty Years of Land-cover and Land-use Change Effects on Nearshore Marine Resources in Southern Chile	2003 award (04-06)
University of Maryland College Park	Weiner, Megan	Radar Monitoring of Hydrologic Variability in Maryland's Forested Coastal Plain Wetlands	2003 award (04-06)
Stanford University	Reddy, Tasha	Model Resolution Effects on Oceanic Primary Production Estimates and Validation using Remotely Sensed Data: A Case Study for the Ross Sea, Antarctica	2003 award (04-06)
University of Miami	Brown, John	A Satellite Remote Sensing Case Study of the Hydrological Cycle and Oceanic Response in the Bay of Bengal.	2003 award (04-06)
University of California, Santa Barbara	Kostadinov, Tihomir	Global Regionalization of a Semi-analytical Ocean Color Algorithm for Case II Environments.	2003 award (04-06)
University of South Florida	Lenes, Jason	Iron Fertilization of *trichodesmium* on West Florida shelf	2002 award (03-05)
Duke	Poulter, Benjamin	Response of coastal ecosystems and carbon storage to rising sea level	2002 award (03-05)
University of California, Santa Barbara	Klamberg, Jonathan	Satellite Measurement of Surface Ocean Mixing and Ventilation Using Open Ocean Colored Dissolved Organic Matter (CDOM) as a Tracer	2002 award (03-05)
University of California Davis	Mulitsch, Melinda	Effects of Global Climate Change on California Coastal Salt Marshes: Integrating remote sensing and spatial ecosystem modeling	2002 award (03-05)

Texas A&M	Wang, Lei	Simulating surface water runoff and assessing impacts of natural and human-induced environmental changes on hydrologic processes by integrating remote sensing data and hydrologic models	2002 award (03-05)

New Investigators

Funded under Earth Science Education – New Investigator Program (NIP)

Institution	PI	Title/Subject	NIP Award Years
University of Hawaii	Hochberg, Eric	Empirical Radiative Transfer Corrections for Deterministic Coral Reef Remote Sensing	2003 award (04–06)
Goddard Space Flight Center	Mannino, Antonio	Dynamics of Coastal Ocean Dissolved Organic Matter	2003 award (04–06)
University of New Hampshire	Morrison, John	Real Time Observations and Interpretation of Solar Radiation in Coastal Waters of New England: Phytoplankton Fluorescence, Ocean Color, and Heating	2003 award (04–06)
University of Maryland College Park	Uz, Baris	Remote Sensing Study of Physical-Biological Interactions in the Ocean; the Role of Baroclinic Disturbances	2003 award (04–06)

GLOBE

Funded under Earth Science Education – GLOBE Program

Institution	PI	Title/Subject
Arizona State	Conklin, Bales, Manglin	Hydrology (Manglin: marine biology)

E. Acronyms and Websites

** See Website for a general list of NASA-related Acronyms **

Link: http://space.about.com/library/weekly/blacroa.htm

ACRONYMS:

ACT	Applied Coherent Technologies
ADCRIC	Advanced Circulation Model
AGU	American Geophysical Union
AMS	American Meteorological Society
AMSR	Advanced Microwave Scanning Radiometer
ARC	Ames Research Center
ASLO	American Society of Limnology and Oceanography
AVHRR	Advanced Very High Resolution Radiometer
BATS	Bermuda Atlantic Time-Series Study
CCRI	Climate Change Research Initiative
CCSP	Climate Change Science Program
CCTP	Climate Change Technology Program
CDOM	Colored Dissolved Organic Matter
CLEAR	Center for Land Use and Education Research
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CREWS	Coral Reef Early Warning System
CSC	Coastal Service Center
DAAC	Distributed Active Archive Center (Data Active Archive Center)
DEVELOP	No longer an acronym
DSS	Decision Support Systems
EAGLE-EYE	Ecological Assessment of Generalized Littoral Environments
ECOHAB	Ecology and Oceanography of Harmful Algal Blooms
EDR	Environmental Data Records
ELCIRC	Eulerian-Lagrangian Circulation
EOS	Earth Observing Systems
EPA	US Environmental Protection Agency
FEA	Federal Enterprise Architecture
FWS	Fish and Wildlife Service
FY	Fiscal Year
GES DAAC	Goddard Earth Science Distributed Active Archive Center
GHRC	Global Hydrology Resource Center
GIG	Global Information Grid
GLOBE	Global Learning and Observations to Benefit the Environment
GMES	Global Monitoring for Environment and Security
GNOME	General NOAA Oil Modeling Environment (Coastal Mgmt. DSS)
GOES	Geostationary Operational Environmental Satellite
GPM	Global Precipitation Measurement
GPMO	Gulf of Mexico Program Office
GSFC	Goddard Space Flight Center
HAB	Harmful Algal Bloom
IBPD	Integrated Budget and Performance Document

IGOS	Integrated Global Observations strategy
IWGEO	Interagency Working Group on Earth Observations
Jason	Spacecraft with instruments to study ocean surface topography
JCSDA	Joint Center for Satellite Data Assimilation
JPL	Jet Propulsion Laboratory
LaRC	Langley Research Center
LP DAAC	Land Processes Distributed Active Archive Center
MMS	Mineral Management Service (Malaria Monitoring and Surveillance)
MODIS	Moderate Resolution Imaging Spectroradiometer
NASA HQ	NASA Headquarters
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NCDDC	National Coastal Data & Distribution Center
NCOM	Navy Coastal Ocean Model
NESDIS	National Environmental Satellite Data Information Service
NIP	New Investigators Program
NMFS	National Marine Fishery Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NPOESS	National Polar-Orbiting Operational Environmental Satellite System
NPP	NPOESS Preparatory Project/Net Primary Productivity
NRL	Navy Research Laboratory
NSF	National Science Foundation
NWS	National Weather Service
OBEAM	Ocean Biogeochemical EOS Assimilation Model
OEA	Office of Environmental Information
OIA	Office of International Activities
OMB	Office of Management and Budget
ORD	Office of Research and Development
ORHAB	Olympic Region Harmful Algal Blooms
OSSE	Observing System Simulation Experiment
OSTM	Ocean Surface Topography Mission
OSTP	Office of Science and Technology Policy
OW	Office of Water
PART	Program Assessment Rating Tool
PO DAAC	Physical Oceanography Distributed Active Archive Center
POC	Point of Contact
POES	Polar Orbiting Environmental Satellites
POM	Princeton Ocean Model
QuikSCAT	Quick Scatterometer
QUODDY	Hydro Dynamic Model Developed by the North Carolina Coastal Observing System
R2O	Research to Operations Network
RACNE	Regional Applications Center for the Northeast
REASoN	Research, Education, and Applications Solutions Network
SEA	State Enterprise Architecture
SeaWiFS	Sea-viewing Wide-Field-of-View Sensor
SHORCIRC	SHORCIRC Near Shore Circulation Model
SSC	Stennis Space Center
SST	Sea surface temperature
SWAN	Solar Winds Anisotropies (Instrument from Finland)

TBD	To Be Determined
TOPEX/POSEIDON	Satellite from JPL with Five Instruments
TOS	The Oceanography Society
TRMM	Tropical Rainfall Measurement Mission
UCAR	University Corporation for Atmospheric Research
UCSB	University of California Santa Barbara
UCSD	University of California San Diego
UK	United Kingdom
U Md – CP	University of Maryland at College Park
UMBC	University of Maryland Baltimore County
UNH	University of New Hampshire
URI	University of Rhode Island
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
USGS	United States Geological Survey
V&V	Verification and Validation
VIIRS	Visible/Infrared Imager/Radiometer Suite
WFF	Wallops Flight Facility

WEBSITES:

HAB Forecasting System: http://www.csc.noaa.gov/crs/habf/index.html

CREWS: http://www.coral.noaa.gov/crews/

REEFBASE: http://www.reefbase.org

GNOME: http://response.restoration.noaa.gov/software/gnome/gnome.html

AIWG: http://aiwg.gsfc.nasa.gov/

Applied Sciences Program: http://science.hq.nasa.gov/earth-sun/applications

DEVELOP: http://develop.larc.nasa.gov

Earth-Sun System Gateway (ESG): http://esg.gsfc.nasa.gov/

Earth-Sun Science System Components: http://www.asd.ssc.nasa.gov/m2m

NASA FY2005 Budget: http://www.ifmp.nasa.gov/codeb/budget2005

Research and Analysis Program: http://science.hq.nasa.gov/earth-sun/science/

Science Mission Directorate: http://science.hq.nasa.gov

Science Strategies: http://science.hq.nasa.gov/strategy/